WHAT IS CLAIMED IS:

1. A process of providing a rubber composition for a component of an article of manufacture (e.g. a tire) comprises applying a directed high frequency energy to an unvulcanized, silica-rich diene-based rubber composition which contains at least one polymer and/or elastomer having a Tm or Tg of at least 0°C, and sulfur curative, wherein said rubber composition has a temperature below 35°C, in at least one directed high frequency energy station to thereby internally preheat the rubber composition by directed high frequency energy to a temperature of at least about 40°C and a maximum of about 90°C;

wherein said directed high frequency energy is applied to said rubber composition within said directed energy station(s) by at least one radio frequency radiation directed energy station by application of radio frequency in a range of from about 0.5 to about 100 MHz and/or at least one microwave frequency radiation directed energy station by application of microwave frequency in a range of from about 900 to about 930 or from about 2300 to about 2600 MHz;

wherein said diene-based rubber composition is comprised of, based upon parts by weight per 100 parts by weight to the total of diene-based elastomer(s) and said polymer and/or elastomer having a Tm or Tg of at least 0°C (phr):

(A) at least about 20 phr of a polymer or elastomer having a Tm or Tg of least 0°C,

(B) at least about 20 phr of at least one diene-based elastomer having a Tm or Tg lower than 0°C,

(C) a dispersion throughout said rubber composition of about 40 to about 80 phr of particulate reinforcement therefor composed of

(1) about 30 to about 75 phr of synthetic precipitated silica,

(2) from zero to about 10 phr of rubber reinforcing carbon black, and

(3) from zero to about 30 phr of at least partially exfoliated, intercalated clay platelets,

(4) about 0.1 to about 4 phr of sulfur, and optionally

(5) about 10 to about 40 phr of rubber processing oil.

2. The process of claim 1 wherein said polymer and/or elastomer having a Tm or Tg of at least 0°C is selected from at least one of trans 1,4-polybutadiene polymer, 3,4-polyisoprene elastomer, styrene/butadiene copolymer elastomer having a styrene content of at least about 30 percent, styrene/butadiene copolymer elastomer with a polybutadiene component having trans 1,4 content of at least about 70 percent, isoprene/butadiene copolymer with a polybutadiene component having a trans 1,4-content of at least 70 percent, natural cis 1,4-polyisoprene rubber and polystyrene polymer so long as said polymer and/or elastomer has a Tm or Tg of at least 0°C.

3. The process of claim1 wherein said polymer and/or elastomer having a Tm or Tg of at least 0°C is a thermoplastic trans 1,4-polybutadiene polymer having a melting point (Tm) in a range of about 30°C to about 45°C.

4. A process of providing a rubber composition for a component of an article of manufacture (e.g. a tire) comprises applying a directed high frequency energy to an unvulcanized, silica-rich diene-based rubber composition which contains a thermoplastic trans 1,4-polybutadiene polymer having a softening point (Tm) in a range of about 30°C to about 45°C, wherein said rubber composition has a temperature below 35°C and has a G' storage modulus at 30°C of at least 800 kPa, in at least one directed high frequency energy station to thereby internally preheat the rubber composition by directed high frequency energy to a temperature of at least about 40°C and a maximum of about 90°C, to thereby reduce the G' Storage Modulus of said rubber composition to less than about 600 kPa;

wherein said directed high frequency energy is applied to said rubber composition within said directed energy station(s) by at least one radio frequency radiation directed energy station by application of radio frequency in a range of from about 0.5 to about 100 MHz and/or at least one microwave frequency radiation directed energy station by application of microwave frequency in a range of from about 900 to about 930 or from about 2300 to about 2600 MHz;

wherein said diene-based rubber composition is comprised of, based upon parts by weight per 100 parts by weight to the total of diene-based elastomer(s) and said polymer and/or elastomer having a Tm or Tg of at least 0°C (phr):

(A) at least about 20 phr of a at least one polymer and/or elastomer having a Tm or Tg of at least 0°C,

(B) at least about 20 phr of at least one diene-based elastomer having a Tm or Tg lower than 0°C, and

(C) a dispersion throughout said rubber composition of about 40 to about 80 phr of particulate reinforcement therefor composed of

(1) about 30 to about 75 phr of synthetic precipitated silica,

(2) from zero to about 10 phr of rubber reinforcing carbon black, and

(3) from zero to about 30 phr of at least partially exfoliated, intercalated clay platelets, and

(D) about 0.1 to about 4 phr of sulfur, and optionally

(E) from about 10 to about 40 phr of aromatic rubber processing oil.

5. The process of claim 1 wherein said rubber composition is internally pre-heated by passing the rubber composition through at least one of said directed high frequency energy stations, wherein said rubber composition contains from about 40 to about 80 phr of particulate reinforcement composed of:

(A) about 36 to about 74 phr of synthetic precipitated silica,

(B) about 4 to about 6 phr of rubber reinforcing carbon black, and

(C) about 0.2 to about 15 phr of at least partially exfoliated, intercalated, clay platelets.

6. The process of claim 1 wherein said rubber composition contains a dispersion therein of from about 10 to about 40 phr of aromatic rubber processing oil and wherein said elastomer having a Tg or Tm lower than 0°C is a diene-based elastomer selected from polymers and copolymers of at least one of isoprene and 1,3-butadiene and copolymers of styrene and/or alpha methylstyrene with at least one of isoprene and 1,3-butradiene so long as said diene-based elastomer has a Tm or Tg lower than 0°C.

7. The process of claim 1 wherein said rubber composition contains a rubber processing oil comprised of an aromaticity content of about 20 to about 50

weight percent, a naphthenic content in a range of about 10 to about 40 weight percent and a paraffinic content in a range of from about 20 to about 50 weight percent.

8. The process of claim 1 which comprises internally preheating the rubber composition with directed high frequency energy applied by:

(A) at least one directed high frequency energy station in which radio frequency energy is applied to said rubber composition at a frequency in a range of about 0.5 to about 100 MHz, or

(B) at least one directed high frequency energy station in which microwave frequency energy is applied to said rubber composition at a frequency in a range of about 900 to about 930 or from about 2300 to about 2600 MHz, or

(C) a combination of:

(1) least one directed high frequency energy station in which radio frequency energy is applied to said rubber composition at a frequency in a range of about 0.5 to about 100 MHz, and

(2) at least one directed high frequency energy station in which microwave frequency energy is applied to said rubber composition at a frequency in a range of about 900 to about 930 or about 2300 to about 2600 MHz, or

(D) a sequential combination of:

(1) a first directed high frequency energy station in which radio frequency energy is applied to said rubber composition at a frequency in a range of about 0.5 to about 100 MHz followed by:

(2) a subsequent directed high frequency energy station in which microwave frequency energy is applied to said rubber composition at a frequency in a range of about 900 to about 930 or about 2300 to about 2600 MHz.

9. The process of claim 1 wherein said process further comprises processing said preheated rubber composition while maintaining the temperature thereof at or above said directed energy induced temperature of at least 40°C by:

(A) extruding said rubber composition in an extruder through a rigid die opening to thereby shape said extruded rubber composition into an elongated contoured

tread strip having a contoured cross-section, building said contoured tread strip into an unvulcanized tire assembly, followed by molding said tire assembly in a suitable mold at a temperature of about 140°C to about 160°C to shape and vulcanize said tire assembly including said contoured tread strip to form a pneumatic tire having a circumferential running surface as a tread comprised of said vulcanized tread strip, or

(B) calendering said rubber composition onto a textile fabric of tire cords by passing said rubber composition and textile fabric between two opposing cylindrical rigid rolls, said rolls revolving in opposite rotational directions to each, other to thereby pull the fabric and rubber composition therebetween and form a ply comprised of said fabric encompassed by said rubber composition, building said ply into an unvulcanized tire assembly wherein said ply extends from bead-to-bead through a crown portion of said tire assembly, followed by molding said tire assembly in a suitable mold at a temperature of about 140°C to about 160°C to shape and vulcanize said tire assembly to form a pneumatic tire, or

(C) extruding said rubber composition in an extruder through a rigid die opening to thereby shape said extruded rubber composition into a contoured elongated sidewall insert strip having a contoured cross-section, building said contoured sidewall strip into a sidewall of an unvulcanized tire assembly, followed by molding said tire assembly in a suitable mold at a temperature of about 140°C to about 160°C to shape and vulcanize said tire assembly including said contoured sidewall strip to form a pneumatic tire having sidewall strip as an insert component of the tire positioned within the tire sidewall, wherein

(1) said sidewall strip is an annular strip in a from of an apex component of the tire of which its contoured cross-section extends radially outward from a bead component of the tire into a sidewall of said tire, or

(2) said sidewall strip is an annular strip in a form of a sidewall insert component of the tire positioned within a sidewall of said tire and spaced apart from a tire bead component of said tire.

10. The process of claim 4 wherein said process further comprises processing said preheated rubber composition while maintaining the temperature thereof at or above said directed energy induced temperature of at least 40°C by:

(A) extruding said rubber composition in an extruder through a rigid die opening to thereby shape said extruded rubber composition into an elongated contoured tread strip having a contoured cross-section, building said contoured tread strip into an unvulcanized tire assembly, followed by molding said tire assembly in a suitable mold at a temperature of about 140°C to about 160°C to shape and vulcanize said tire assembly including said contoured tread strip to form a pneumatic tire having a circumferential running surface as a tread comprised of said vulcanized tread strip, or

(B) calendering said rubber composition onto a textile fabric of tire cords by passing said rubber composition and textile fabric between two opposing cylindrical rigid rolls, said rolls revolving in opposite rotational directions to each, other to thereby pull the fabric and rubber composition therebetween and form a ply comprised of said fabric encompassed by said rubber composition, building said ply into an unvulcanized tire assembly wherein said ply extends from bead-to-bead through a crown portion of said tire assembly, followed by molding said tire assembly in a suitable mold at a temperature of about 140°C to about 160°C to shape and vulcanize said tire assembly to form a pneumatic tire, or

(C) extruding said rubber composition in an extruder through a rigid die opening to thereby shape said extruded rubber composition into a contoured elongated sidewall insert strip having a contoured cross-section, building said contoured sidewall strip into a sidewall of an unvulcanized tire assembly, followed by molding said tire assembly in a suitable mold at a temperature of about 140°C to about 160°C to shape and vulcanize said tire assembly including said contoured sidewall strip to form a pneumatic tire having sidewall strip as an insert component of the tire positioned within the tire sidewall, wherein

(1) said sidewall strip is an annular strip in a from of an apex component of the tire of which its contoured cross-section extends radially outward from a bead component of the tire into a sidewall of said tire, or

(2) said sidewall strip is an annular strip in a form of a sidewall insert component of the tire positioned within a sidewall of said tire and spaced apart from a tire bead component of said tire.

11. The process of claim 4 which comprises internally preheating the rubber composition with directed high frequency energy applied by:

(A) at least one directed high frequency energy station in which radio frequency energy is applied to said rubber composition at a frequency in a range of about 2 to about 80 MHz, or

(B) at least one directed high frequency energy station in which microwave frequency energy is applied to said rubber composition at a frequency in a range of about 900 to about 930 or from about 2300 to about 2600 MHz, or

(C) a combination of:

(1) least one directed high frequency energy station in which radio frequency energy is applied to said rubber composition at a frequency in a range of about 2 to about 80 MHz, and

(2) at least one directed high frequency energy station in which microwave frequency energy is applied to said rubber composition at a frequency in a range of about 900 to about 930 or about 2300 to about 2600 MHz, or

(D) a sequential combination of:

(1) a first directed high frequency energy station in which radio frequency energy is applied to said rubber composition at a frequency in a range of about 2 to about 80 MHz followed by:

(2) a subsequent directed high frequency energy station in which microwave frequency energy is applied to said rubber composition at a frequency in a range of about 900 to about 930 or about 2300 to about 2600 MHz.

12. The process of claim 11 wherein said process further comprises processing said preheated rubber composition while maintaining the temperature thereof at or above said directed energy induced temperature of at least 40°C by:

(A) extruding said rubber composition in an extruder through a rigid die opening to thereby shape said extruded rubber composition into an elongated contoured tread strip having a contoured cross-section, building said contoured tread strip into an unvulcanized tire assembly, followed by molding said tire assembly in a suitable mold at a temperature of about 140°C to about 160°C to shape and vulcanize said tire assembly including said contoured tread strip to form a pneumatic tire having a circumferential running surface as a tread comprised of said vulcanized tread strip, or

(B) calendering said rubber composition onto a textile fabric of tire cords by passing said rubber composition and textile fabric between two opposing cylindrical rigid rolls, said rolls revolving in opposite rotational directions to each, other to thereby pull the fabric and rubber composition therebetween and form a ply comprised of said fabric encompassed by said rubber composition, building said ply into an unvulcanized tire assembly wherein said ply extends from bead-to-bead through a crown portion of said tire assembly, followed by molding said tire assembly in a suitable mold at a temperature of about 140°C to about 160°C to shape and vulcanize said tire assembly to form a pneumatic tire, or

(C) extruding said rubber composition in an extruder through a rigid die opening to thereby shape said extruded rubber composition into a contoured elongated sidewall insert strip having a contoured cross-section, building said contoured sidewall strip into a sidewall of an unvulcanized tire assembly, followed by molding said tire assembly in a suitable mold at a temperature of about 140°C to about 160°C to shape and vulcanize said tire assembly including said contoured sidewall strip to form a pneumatic tire having sidewall strip as an insert component of the tire positioned within the tire sidewall, wherein

(1) said sidewall strip is an annular strip in a from of an apex component of the tire of which its contoured cross-section extends radially outward from a bead component of the tire into a sidewall of said tire, or

(2) said sidewall strip is an annular strip in a form of a sidewall insert component of the tire positioned within a sidewall of said tire and spaced apart from a tire bead component of said tire.

13. The process of claim 1 wherein said process further comprises processing said preheated rubber composition while maintaining the temperature thereof at or above said directed energy induced temperature of at least 40°C by extruding said rubber composition in an extruder through a rigid die opening to thereby shape said extruded rubber composition into a shaped unvulcanized rubber component, building said shaped component into an unvulcanized tire assembly, followed by molding said tire assembly in a suitable mold at a temperature of about 140°C to about 160°C to shape and vulcanize said tire assembly to form a pneumatic tire.

14. A rubber composition prepared by the process of claim 1.

15. A rubber composition prepared by the process of claim 2.

16. A rubber composition prepared by the process of claim 4.

17. A rubber composition prepared by the process of claim 8.

18. A tire prepared by the process of claim 9.

19. A tire prepared by the process of claim 10.

20. A tire prepared by the process of claim 13.